

WHAT IS CLAIMED IS:

1 1. A process of modeling signal strength coverage of a wireless network based on
2 empirical coverage measurements for the network over a region of interest, based on user
3 inputs, and based on terrain data in the region of interest, the network having plural base
4 station antennas, the process comprising:

5 mapping the empirical coverage measurements onto the terrain data to provide an
6 initial coverage model;

7 receiving from a user an input for change of a parameter of one of the antennas;
8 generating outputs of signal strength at points on the terrain that are affected by the
9 parameter change; and

10 modifying the initial coverage model based on the generated outputs of signal
11 strength to provide a hypothetical coverage model.

1 2. The process of claim 1, wherein the parameter is chosen from the group
2 consisting of: antenna height, antenna tilt angle, antenna type, antenna azimuth, and
3 transmitted signal power at the antenna.

1 3. The process of claim 1, further comprising:
2 providing a visual representation of signal strength coverage according to the
3 initial coverage model.

1 4. The process of claim 1, further comprising:
2 providing a visual representation of signal strength coverage according to the
3 hypothetical coverage model.

1 5. The process of claim 1, further comprising:

2 providing a comparative visual representation of signal strength coverage
3 according to superposition of the initial coverage model with the hypothetical coverage
4 model.

1 6. A process of generating a neighbor list for a sector-of-interest in a wireless
2 network based on empirical measurements of signal to noise ratio, the process comprising:
3 calculating a weight for every pair wise combination of the sector-of-interest other
4 network sectors between which a predetermined threshold signal level criteria, T_ADD, is
5 met;
6 ordering the calculated weights from largest to smallest; and
7 listing the sectors that meet the T_ADD criteria with respect to the sector-of-
8 interest in rank order corresponding to the ordered calculated weights.

1 7. The process of claim 6, wherein weight is calculated, with respect to two
2 neighbor sectors a and b, as follows:

3
$$\text{weight}_{a \rightarrow b} = \sum_{i=1}^n 10^{\{[(E_c/I_0(a,i) - T_ADD) + (E_c/I_0(b,i) - T_ADD)]/10\}}$$

4
5

6 wherein E_c/I_0 is the signal-to-noise ratio of each sector at each location, and the
7 value of n represents the number of locations over which summation is to occur.

1 8. A process of selecting a value of window size for a sector-of-interest in a code
2 division multiple access wireless network, the process comprising:
3 select the earliest arriving multipath signal of all sectors that meet the threshold
4 criteria $E_c/I_0 > T_ADD$, wherein T_ADD is a predetermined threshold signal level;

5 select a pair of sectors, ToSector and FromSector, that meet the threshold criteria

6 $E_c/I_o > T_ADD$;

7 set a window size of FromSector = chip delay of ToSector - chip delay of the
8 earliest arriving multipath sector;

9 evaluate whether the window size of FromSector > maximum window size; and

10 in the event that the window size of FromSector is greater than the maximum
11 window size, then set maximum FromSector window size = the window size of

12 FromSector.

1 9. A process of generating a value of timing advance for a sector-of-interest in a
2 time division-type wireless network, the process comprising:

3 select a sector, FromSector, with a sufficient Received Signal Strength Indication
4 (RSSI) to serve a call;

5 calculate the distance to FromSector;

6 set timing advance of FromSector = one half the distance to FromSector;

7 evaluate whether FromSector's timing advance > maximum timing advance; and

8 in the event that FromSector's timing advance is greater than the maximum timing
9 advance, then set maximum FromSector timing advance = FromSector timing advance.

1 10. A computer program product for enabling a computer to model signal strength
2 coverage of a wireless network based on empirical coverage measurements for the
3 network over a region of interest, based on user inputs, and based on terrain data in the
4 region of interest, the network having plural base station antennas, the computer program
5 product comprising:

6 software instructions for enabling the computer to perform predetermined operations, and

7 a computer readable medium embodying the software instructions;
8 the predetermined operations comprising:
9 mapping the empirical coverage measurements onto the terrain data to provide an
10 initial coverage model;
11 receiving from a user an input for change of a parameter of one of the antennas;
12 generating outputs of signal strength at points on the terrain that are affected by the
13 parameter change; and
14 modifying the initial coverage model based on the generated outputs of signal strength
15 to provide a hypothetical coverage model.

1 11. A computer program product for enabling a computer to generate a neighbor
2 list for a sector-of-interest in a wireless network based on empirical measurements of
3 signal to noise ratio, the computer program product comprising:
4 software instructions for enabling the computer to perform predetermined operations, and
5 a computer readable medium embodying the software instructions;
6 the predetermined operations comprising:
7 calculating a weight for every pair wise combination of the sector-of-interest other
8 network sectors between which a predetermined threshold signal level
9 criteria, T_ADD, is met;
10 ordering the calculated weights from largest to smallest; and
11 listing the sectors that meet the T_ADD criteria with respect to the sector-of-
12 interest in rank order corresponding to the ordered calculated weights.

1 12. A computer program product for enabling a computer to select a value of
2 window size for a sector-of-interest in a code division multiple access wireless network,
3 the computer program product comprising:
4 software instructions for enabling the computer to perform predetermined operations, and
5 a computer readable medium embodying the software instructions;
6 the predetermined operations comprising:

7 select the earliest arriving multipath signal of all sectors that meet the threshold
8 criteria $E_c/I_o > T_ADD$, wherein T_ADD is a predetermined threshold
9 signal level;

10 select a pair of sectors, ToSector and FromSector, that meet the threshold criteria
11 $E_c/I_o > T_ADD$;

12 set a window size of FromSector = chip delay of ToSector - chip delay of the
13 earliest arriving multipath sector;

14 evaluate whether the window size of FromSector > maximum window size; and
15 in the event that the window size of FromSector is greater than the maximum
16 window size, then set maximum FromSector window size = the window
17 size of FromSector.

1 13. A computer program product for enabling a computer to generate a value of
2 timing advance for a sector-of-interest in a time division-type wireless network, the
3 computer program product comprising:
4 software instructions for enabling the computer to perform predetermined operations, and
5 a computer readable medium embodying the software instructions;
6 the predetermined operations comprising:

7 select a sector, FromSector, with a sufficient Received Signal Strength Indication

8 (RSSI) to serve a call;

9 calculate the distance to FromSector;

10 set timing advance of FromSector = one half the distance to FromSector;

11 evaluate whether FromSector's timing advance > maximum timing advance; and

12 in the event that FromSector's timing advance is greater than the maximum timing

13 advance, then set maximum FromSector timing advance = FromSector

14 timing advance.

1 14. A computer system adapted to model signal strength coverage of a wireless
2 network based on empirical coverage measurements for the network over a region of
3 interest, based on user inputs, and based on terrain data in the region of interest, the
4 network having plural base station antennas, comprising:

5 a processor, and

6 a memory including software instructions adapted to enable the computer system
7 to perform operations comprising:

8 mapping the empirical coverage measurements onto the terrain data to provide

9 an initial coverage model;

10 receiving from a user an input for change of a parameter of one of the antennas;

11 generating outputs of signal strength at points on the terrain that are affected by

12 the parameter change; and

13 modifying the initial coverage model based on the generated outputs of signal

14 strength to provide a hypothetical coverage model.

1 15. A computer system adapted to generate a neighbor list for a sector-of-interest
2 in a wireless network based on empirical measurements of signal to noise ratio,
3 comprising:
4 a processor, and
5 a memory including software instructions adapted to enable the computer system
6 to perform operations comprising:
7 calculating a weight for every pair wise combination of the sector-of-interest
8 other network sectors between which a predetermined threshold signal level
9 criteria, T_ADD , is met;
10 ordering the calculated weights from largest to smallest; and
11 listing the sectors that meet the T_ADD criteria with respect to the sector-of-
12 interest in rank order corresponding to the ordered calculated weights.

1 16. A computer system adapted to select a value of window size for a sector-of-
2 interest in a code division multiple access wireless network, comprising:
3 a processor, and
4 a memory including software instructions adapted to enable the computer system
5 to perform operations comprising:
6 select the earliest arriving multipath signal of all sectors that meet the threshold
7 criteria $E_c/I_o > T_ADD$, wherein T_ADD is a predetermined threshold
8 signal level;
9 select a pair of sectors, ToSector and FromSector, that meet the threshold
10 criteria $E_c/I_o > T_ADD$;

11 set a window size of FromSector = chip delay of ToSector - chip delay of the
12 earliest arriving multipath sector;
13 evaluate whether the window size of FromSector > maximum window size;
14 and
15 in the event that the window size of FromSector is greater than the maximum
16 window size, then set maximum FromSector window size = the window
17 size of FromSector.

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1 17. A computer system adapted to generate a value of timing advance for a sector-
2 of-interest in a time division-type wireless network, comprising:
3 a processor, and
4 a memory including software instructions adapted to enable the computer system
5 to perform operations comprising:
6 select a sector, FromSector, with a sufficient Received Signal Strength
7 Indication (RSSI) to serve a call;
8 calculate the distance to FromSector;
9 set timing advance of FromSector = one half the distance to FromSector;
10 evaluate whether FromSector's timing advance > maximum timing advance;
11 and
12 in the event that FromSector's timing advance is greater than the maximum
13 timing advance, then set maximum FromSector timing advance =
14 FromSector timing advance.